Attorney Docket No.: 033808.158

PATENT

ATTN: CERTIFICATE OF CORRECTION DIVISION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants	:	Atanas TOMOV, et al.
U.S. Serial No.	:	09/936,902
U.S. Patent No.	:	6,818,714
Issued	:	November 16, 2004
For	:	METHOD FOR POLYMERIZING OLEFINS IN THE PRESENCE OF NICKEL COMPLEXES AND CORRESPONDING CATALYTIC SYSTEM

REQUEST FOR CERTIFICATE OF CORRECTION UNDER 37 CFR §1.322 AND §1.323

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

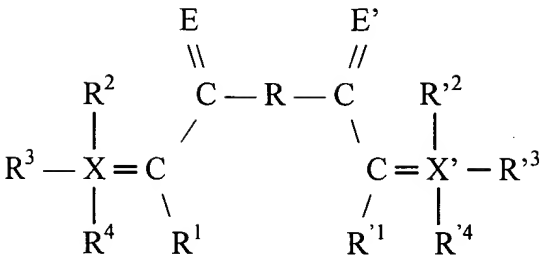
In accordance with 37 CFR §1.322 and §1.323, request is hereby made for official correction of U.S. Patent No. 6,818,714 B1 ("the issued patent").

Form PTO-1050 is attached.

As discussed below, review of the issued patent uncovered errors made by the U.S. Patent and Trademark Office ("USPTO") and errors made by Applicants.

Error in Formula (I)'

In claim 1, at column 13, lines 16-23, and claim 3, at column 15, lines 55-60, formula (I)' erroneously has a "P" where it should have an "X". Thus, the correct version of formula (I)' is as follows:

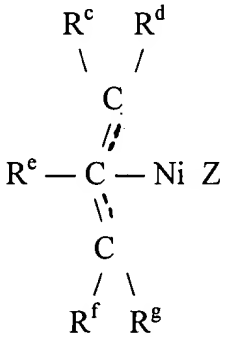


The error to formula (I)' was made by the USPTO. As evidence of this, attached is a copy of an Amendment filed on April 26, 2004, setting forth claims 97 and 99 (which were later renumbered as claims 1 and 3, respectively). As shown in the attached copy of the Amendment filed on April 26, 2004, claims 97 and 99 contained the correct version of formula (I)'.

Thus, it is respectfully requested that claims 1 and 3 be amended to contain the correct version of formula (I)'.

Error in Formula (III)

In claim 1, at column 14, lines 2-9, and claim 3, at column 16, lines 40-46, formula (III) has double lines where it should have a combination of a straight line and a dashed line. Thus, the correct version of formula (III) is as follows:

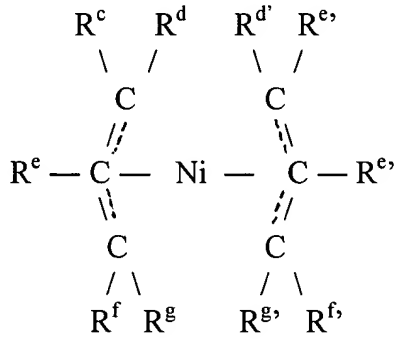


The error in formula (III) was made by Applicants. Support for the correct version of formula (III) can be found in the specification at, e.g., column 3, lines 1-10. Thus, the correct version of formula (III) set forth above does not represent new matter.

Accordingly, it is respectfully requested that claims 1 and 3 be amended to contain the correct version of formula (III).

Errors in Formula (IV)

In claim 1, at column 14, lines 27-33, and claim 3, at column 17, lines 2-8, formula (IV) has double lines where it should have a combination of a straight line and a dashed line, and further has Rc and Rc' where it should have Re and Re', respectively. Thus, the correct version of formula (IV) is as follows:



The error regarding the incorrect recitation of R^c instead of R^e was made by the USPTO. Evidence of this can be seen in the attached copy of claims 97 and 99. The error regarding the incorrect recitation of $R^{c'}$ instead of $R^{e'}$ was made by Applicants. In addition, the incorrect use of double lines instead of a combination of a solid line and a dashed line was made by Applicants. Support for the correct version of formula (IV) can be found in the specification at, e.g., col. 3, lines 31-41. Thus, the correct version of formula (IV) presented above does not constitute new matter.

Accordingly, it is respectfully requested that claims 1 and 3 be amended to contain the correct version of formula (IV).

Submitted herewith is a check for the sum of $100, in payment of the fee required under 37 CFR §1.323 and set forth in 37 CFR §1.20(a).

If any additional fees under 37 C. F. R. §§ 1.16 or 1.17 are due in connection with this filing, please charge the fees to Deposit Account No. 02-4300, Order No. 033808.158.

Respectfully submitted,
SMITH, GAMBRELL & RUSSELL, LLP

By: _____

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Dated: March 27, 2006

Enclosures: (1) PTO Form 1050
(2) Copy of Amendment Filed on April 26, 2004
(3) Check for sum of $100

PTO/SB/44 (04-04)
Approved for use through 04/30/2007. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

(Also Form PTO-1050)

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

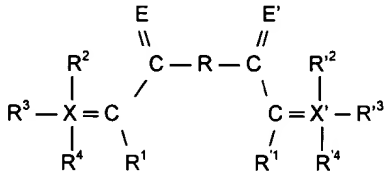
PATENT NO : U.S. Patent No. 6,818,714

DATED : November 16, 2004

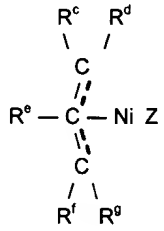
INVENTORS: Atanas TOMOV, et al.

It is certified that errors appear in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

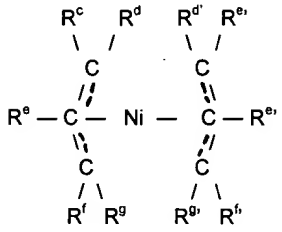
In claim 1, at col. 13, lines 16-23, please replace formula (I)' with the following:



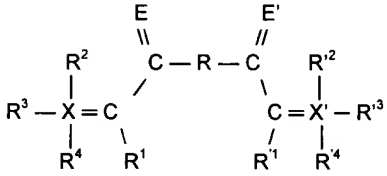
In claim 1, at col. 14, lines 2-9, please replace formula (III) with the following:



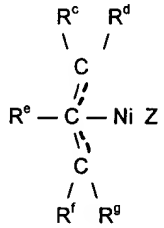
In claim 1, at col. 14, lines 27-33, please replace formula (IV) with the following:



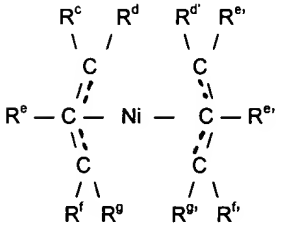
In claim 3, at col. 15, lines 55-60, please replace formula (I)' with the following:



In claim 3, at col. 16, lines 40-46, please replace formula (III) with the following:



In claim 3, at col. 17, lines 2-8, please replace formula (IV) with the following:



PATENT NO. 6,818,714

MAILING ADDRESS OF SENDER: SMITH, GAMBRELL & RUSSELL, LLM
1850 M Street, NW – Suite 800
Washington, D.C. 20036

No. of additional copies

1

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Attorney Docket:
33808 F 158

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CONFIRMATION NO. 4448

In re Application of	:	Atanas TOMOV, et al.
Serial No	:	09/936,902
Filed	:	February 4, 2002
Examiner	:	Robert D. Harlan
Group Art Unit	:	1713

For : METHOD FOR POLYMERISING OLEFINS IN THE PRESENCE OF NICKEL COMPLEXES AND CORRESPONDING CATALYTIC SYSTEM

AMENDMENT SUBMITTED WITH RCE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Amendment is being filed with a Request for Continued Examination, a Petition for Extension of Time (Two Month) and payment of the corresponding fee.

In response to the Office Action dated November 26, 2003, please consider the following remarks.

Remarks

Claims 51-56, 58-75, 77-94 and 97-100 are pending herein. By this Amendment, claims 46-50, 57, 95 and 96 have been cancelled; claims 51-55 and 58 have been amended; and new claims 97-100 have been added. New claims 97 and 99 replace cancelled claims 46 and 57, respectively. Thus, the independent claims are now 97 and 99.

New claim 97 is directed to a catalytic system for the polymerization of at least one olefin in a diluting medium in the presence of the catalytic system, the catalytic system being in formed *in situ* from: (A) at least one ligand represented by formula (Ia), (Ib), (Ic), (Id') or (I'), and (B) at least one nickel compound selected (B1), (B2) and (B3). New claim 98 depends upon claim 97 and limits the ligand(s) to that of formula (Ia'), which is a species of the ligand of formula (Ia).

Support for the recitation in new claim 97 that the catalytic system is formed *in situ* can be found in the specification at, for example, page 1, lines 3-5, and page 2, lines 3-4. Support for the ligands of formulas (Ia), (Ib) and (Ic) recited in claim 97 can be found, e.g., in cancelled claim 50. The ligand of formula (Id') is a species of the ligand of formula (Id) in cancelled claim 46. The ligand of formula (I') in claim 97 is a species of the ligand of formula (I) recited in cancelled claim 46.

New claim 99 is directed to a process for the polymerization of at least one olefin in a diluting medium in the presence of the catalytic system recited in claim 97. New claim 100 depends upon claim 99 and limits the ligand(s) used in the catalytic system to the ligand of formula (Ia').

Claims 51-55 have been amended to depend upon new claim 97 rather than cancelled claim 46.

Claim 58 has been amended to depend upon new claim 99 rather than cancelled claim 57.

In the Office Action, claims 46-75 and 77-96 are rejected under 35 U.S.C. §102(b) as being anticipated by Kurtev et al., *Binuclear nickel-ylide complexes as effective ethylene oligomerization/polymerization catalysts*, Journal of Molecular Catalysis A: Chemical 103 (1995) pages 95-103 ("Kurtev").

In view of the remarks herein, Applicants respectfully request reconsideration and withdrawal of the rejection set forth in the Office Action.

I. The Rejection

Claims 46-75 and 77-96 are rejected under 35 U.S.C. §102(b) as being anticipated by Kurtev. As noted above, claims 46-50, 57, 95 and 96 have been cancelled; claims 51-55 and 58 have been amended; and new claims 97-100 have been added. The independent claims are now 97 and 99.

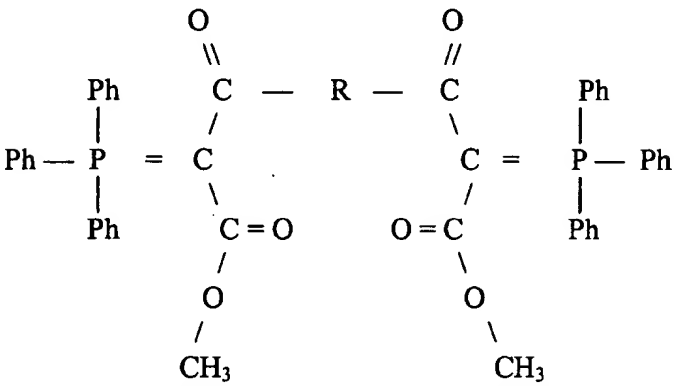
As stated above, new claim 97 is directed to a catalytic system for the polymerization of at least one olefin in a diluting medium in the presence of the catalytic system, the catalytic system being in formed *in situ* from: (A) at least one ligand represented by formula (Ia), (Ib), (Ic), (Id') or (I'), and (B) at least one nickel compound selected (B1), (B2) and (B3). New claim 99 is directed to a process for the polymerization of at least one olefin in a diluting medium in the presence of the catalytic system recited in claim 97. New claims 98 and 100 respectively depend upon claims 97 and 99 and limit the ligand(s) to that of formula (Ia'), which is a species of the ligand of formula (Ia).

Thus, because the catalytic system set forth in claims 97 and 99 is formed *in situ*, the catalytic system polymerizes ethylene in the absence of a phosphine scavenger.

For at least the reasons given below, Applicants respectfully submit that Kurtev does not anticipate new independent claims 97 and 99 or dependent claims 51-56, 58-75, 77-94, 98 and 100.

1. **Ligand of Formula (Ia)**

In claims 97 and 99, the ligand of formula (Ia) has the following structure:



(Ia)

where R represents a 5,6-bicyclo[2.2.1]hept-2-ene radical; $-(CH_2)_4-$; or $-(CH_2)_8-$.

Even if the ligand of formula (Ia) is considered to correspond to ligands which can be used to form catalyst complexes # 4 and #5 set forth on page 97 of Kurtev, Applicants submit that Kurtev still does not anticipate the catalytic system set forth in claim 97 or the method set forth in claim 99.

Kurtev teaches that "[a]ll the binuclear nickel-ylide complexes (1-9) polymerize ethylene in presence of phosphine scavengers to give polyethylene" (page 97). Although the reference teaches that "[c]omplexes 1, 2 and 9 polymerize ethylene even without phosphine scavengers thus producing low molecular weight polyethylene" (page 97), Kurtev does not teach that complexes 4 and 5 can polymerize ethylene in the absence of a phosphine scavenger. In fact, Kurtev teaches that even in the presence of a phosphine scavenger, complex 3 (as well as complexes 5 and 6) oligomerizes ethylene "but the product linearity is lower than those obtained by the related mononuclear complexes" (page 97).

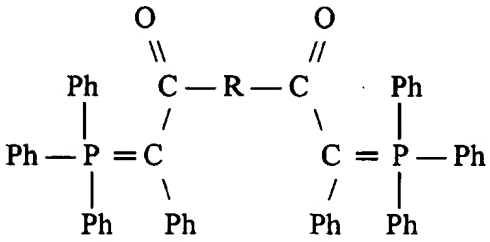
As pointed out above, the catalytic system set forth in instant claims 97 and 99 is formed *in situ* and polymerizes ethylene in the absence of a phosphine scavenger. If the ligand used to form Applicants' claimed catalytic system were used in the reaction scheme shown at the top of Kurtev's page 97, the resulting catalyst would not be the

same as Applicants' catalyst because the Kurtev reaction scheme uses a phosphine scavenger.

Thus, for at least the foregoing reasons, Applicants submit that Kurtev does not teach or suggest Applicants' claimed catalytic system using the ligand of formula (Ia) and, therefore, does not anticipate either such catalytic system or a method of using such catalytic system to polymerize olefins.

2. <u>Ligand of Formula (Ib)</u>

In claims 97 and 99, the ligand of formula (Ib) has the following structure:



(Ib)

wherein R represents a 5,6-bicyclo[2.2.2]-hept-2-ene radical or $-(CH_2)_8-$.

Even if the ligand of formula (Ib) is considered to correspond to a ligand which can be used to form catalyst complex # 6 set forth on page 97 of Kurtev, Applicants submit that Kurtev still does not anticipate the catalytic system set forth in claim 97 or the method set forth in claim 99.

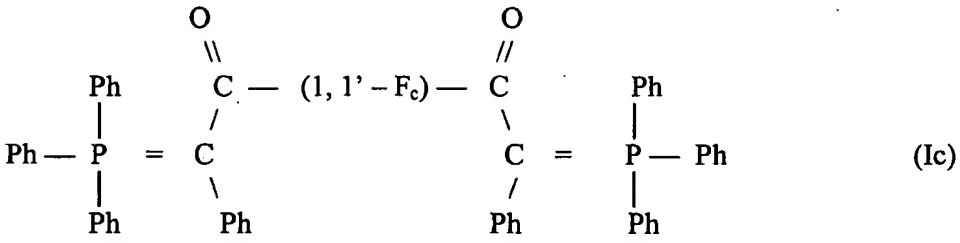
As pointed out above, Kurtev teaches that "[a]ll the binuclear nickel-ylide complexes (1-9) polymerize ethylene in presence of phosphine scavengers to give polyethylene" (page 97). Kurtev does not teach that complex 6 can polymerize ethylene in the absence of a phosphine scavenger. Kurtev teaches that even in the presence of a phosphine scavenger, complex 6 (as well as complexes 3 and 5) oligomerizes ethylene "but the product linearity is lower than those obtained by the related mononuclear complexes" (page 97).

As discussed above, the catalytic system set forth in instant claims 97 and 99 is formed *in situ* and polymerizes ethylene in the absence of a phosphine scavenger. If the ligand used to form Applicants' claimed catalytic system were used in the reaction scheme shown at the top of Kurtev's page 97, the resulting catalyst would not be the same as Applicants' catalyst because the Kurtev reaction scheme uses a phosphine scavenger.

Thus, for at least the foregoing reasons, Applicants submit that Kurtev does not teach or suggest Applicants' claimed catalytic system using the ligand of formula (Ib) and, therefore, does not anticipate either such catalytic system or a method of using such catalytic system to polymerize olefins.

3. <u>Ligand of Formula (Ic)</u>

In claims 97 and 99, the ligand of formula (Ic) has the following structure:



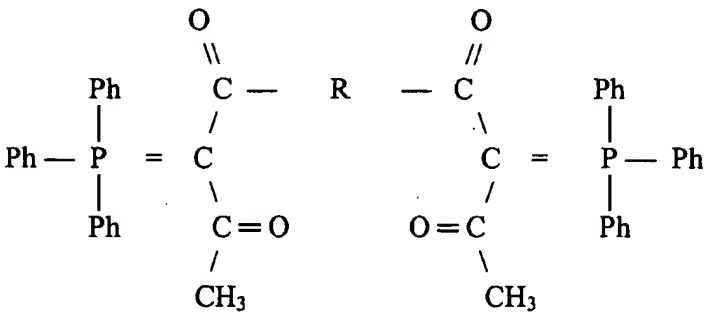
(Ic)

where 1,1'-F_c represents a-1,1'-ferrocenylene radical.

None of the catalyst complexes disclosed in Kurtev contains a 1,1'-ferrocenylene radical as the "R" group. Thus, Kurtev does not teach or suggest a catalytic system containing a ligand of formula (Ic) or a method of using catalytic system to polymerize an olefin.

4. Ligand of Formula (Id')

In claims 97 and 99, the ligand of formula (Id') has the following structure:



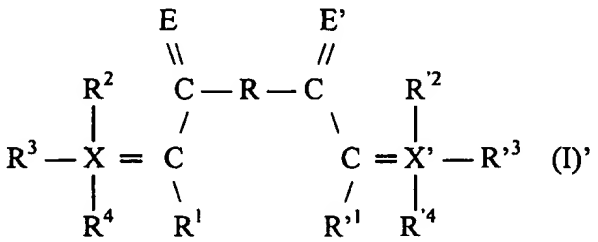
(Id')

where R represents a phenyl radical of the formula 1,4-C_6H_4.

None of the catalyst complexes disclosed in Kurtev contains a combination of a 1,4-C_6H_4 phenyl radical as the "R" group and a $-C(O)OCH_3$ radical as the "R^1" group. Thus, Kurtev does not teach or suggest a catalytic system containing a ligand of formula (Id') or a method of using catalytic system to polymerize an olefin.

5. Ligand of Formula (I)'

In claims 97 and 99, the ligand of formula (I)' has the following structure:



(I)'

where:

- E and E' each represent independently an oxygen or a sulfur atom;
- X and X' each represent independently a phosphorus, arsenic or antimony atom;
- the radicals R^1 and R'^1, which are identical or different, are selected from the group consisting of:
  * branched or cyclic alkyl radicals;

* arylalkyl radicals;

* alkylaryl radicals;

* halogens;

* hydroxyl radical; and

* alkoxide radicals;

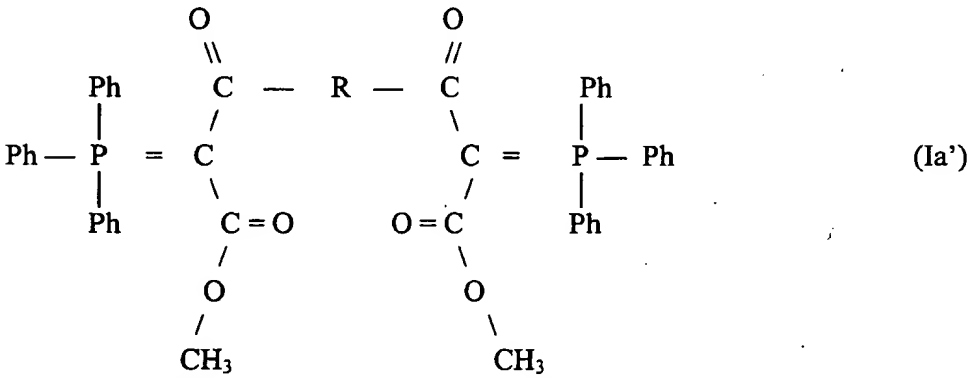
- the R^2, R'^2, R^3, R'^3, R^4 and R'^4 radicals, which are identical or different, are selected from the group consisting of linear, branched or cyclic alkyl radicals; and

- R is a divalent radical.

None of the catalyst complexes disclosed in Kurtev contains any of the R^1 groups which can be used in the ligand of formula (I)'. Thus, Kurtev does not teach or suggest a catalytic system containing a ligand of formula (I)' or a method of using such catalytic system to polymerize an olefin.

6. <u>Ligand of Formula (Ia')</u>

In claims 98 and 100, the ligand of formula (Ia') has the following structure:



(Ia')

where R represents a 5,6-bicyclo[2.2.1]hept-2-ene radical.

In the ligand of formula (Ia'), R is a 5,6-bicyclo[2.2.1]hept-2-ene radical and R_1 is a $C(O)OCH_3$ radical. Kurtev does not teach this combination of R and R_1 radicals.

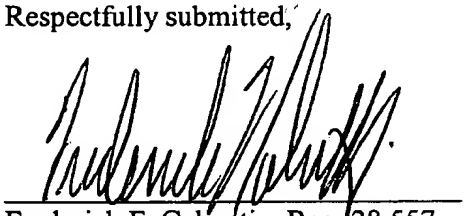
Therefore, Kurtev does not teach or suggest a catalytic system formed from a ligand of formula (Ia') or a method of using such catalytic system.

Therefore, for at least the foregoing reasons, Applicants submit that Kurtev does not anticipate instant claims 51-56, 58-75, 77-94 and 97-100.

II. Conclusion

In view of the foregoing remarks, Applicants respectfully request that the §102 rejection be withdrawn and that claims 51-56, 58-75, 77-94 and 97-100 be allowed.

Respectfully submitted,



Frederick F. Calvetti, Reg. 28,557

Date : April 26, 2004

SMITH, GAMBRELL & RUSSELL, LLP
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212860

In the Claims:

Please cancel claims 46-50, 57, 95 and 96.

Please add new claims 97-100 as set forth in the attached "Listing of Claims".

Please amend claims 51-55 and 58 as set forth in the Listing of Claims.

LISTING OF CLAIMS

Claim 1-50 (Cancelled)

Claim 51 (Currently Amended): The catalytic system as claimed in claim ~~46~~ 97, wherein the nickel compound (B_1) is selected from:

- bis(1,5-cyclooctadiene)nickel(0);
- bis(cyclooctatetraene)nickel(0); and
- bis(1,3,7-octatriene)nickel(0).

Claim 52 (Currently Amended): The catalytic system as claimed in claim ~~46~~ 97, wherein, in a nickel compound (B2) or (B3), a π-allyl group has from 3 to 12 carbon atoms which do not have other aliphatic unsaturated groups, except where it contains a closed cycle.

Claim 53 (Currently Amended): The catalytic system as claimed in claim ~~46~~ 97, wherein the nickel compound (B2) is selected from:

π- allylnickel chloride;
π - allylnickel bromide;
π - crotylnickel chloride;
π - methylallylnickel chloride;
π - ethylallylnickel chloride;
π - cyclopentylallylnickel bromide;
π - cyclooctenylnickel chloride;
π - cyclooctadienylnickel chloride;
π - cynnamylnickel bromide;
π - phenylallylnickel chloride;
π - cyclohexenylnickel bromide;
π - cyclododecenylnickel chloride;

π - cyclododecatrienylnickel chloride;

π - allylnickel acetate;

π - methylallylnickel propionate;

π - cyclooctenylnickel octoate;

π - cyclooctenylnickel methoxylate; and

π - allylnickel ethoxylate.

Claim 54 (Currently Amended): The catalytic system as claimed in claim ~~46~~ 97, wherein the nickel compound (B3) is selected from:

. bis(π - allyl)nickel;

. bis(π - methallyl)nickel;

. bis(π - cynnamyl)nickel;

. bis(π - octadienyl)nickel;

. bis(π - cyclohexenyl)nickel;

. π - allyl- π - methallylnickel; and

. bis(π - cyclooctatrienyl)nickel.

Claim 55 (Currently Amended): The catalytic system as claimed in claim ~~46~~ 97, wherein the components (A) and (B) are present in amounts such that the nickel-to-ligand(s) molar ratio is between 1 and 100.

Claim 56 (Previously Presented) The catalytic system as claimed in claim 55, wherein the components (A) and (B) are present in amounts such that the nickel-to-ligand(s) molar ratio is between 2 and 50.

Claim 57 (Cancelled)

Claim 58 (Currently Amended): The process as claimed in claim ~~57~~ 99, wherein:

- in a first step, each of the constituents (A) and (B), which are in solution in an inert solvent, are introduced separately or simultaneously into a reactor, together with the reaction mixture; and

- in a second step, the olefin or olefins are introduced, the (co)polymerization taking place at a temperature between 0 and 300°C and at a total absolute pressure of from 1 to 200 bar.

Claim 59 (Previously Presented): The process as claimed in claim 58, wherein the constituents (A) and (B) are introduced in a nickel-to-ligand(s) molar ratio of between 1 and 100.

Claim 60 (Previously Presented): The process as claimed in claim 59, wherein the constituents (A) and (B) are introduced in a nickel-to-ligand(s) molar ratio of between 2 and 50.

Claim 61 (Previously Presented): The process as claimed in claim 58, wherein the inert solvent of constituents (A) and (B) is selected from saturated aliphatic hydrocarbons, saturated alicyclic hydrocarbons, aromatic hydrocarbons and mixtures thereof.

Claim 62 (Previously Presented): The process as claimed in claim 58, wherein the reaction mixture consists of an organic medium.

Claim 63 (Previously Presented): The process as claimed in claim 58, wherein the reaction mixture comprises a continuous liquid aqueous phase, which comprises more than 30% water by weight.

Claim 64 (Previously Presented): The process as claimed in claim 63, wherein the aqueous phase is the only liquid phase.

Claim 65 (Previously Presented): The process as claimed in claim 63, wherein the mixture comprises an organic liquid phase.

Claim 66 (Previously Presented): The process as claimed in claim 62, wherein the medium or the organic phase is selected from:

- saturated aliphatic hydrocarbons, saturated alicyclic hydrocarbons, aromatic hydrocarbons and mixtures thereof; and
- to the extent that the polymerization conditions keep them in liquid form, α- olefins, unconjugated dienes and mixtures thereof.

Claim 67 (Previously Presented): The process as claimed in claim 63, wherein the polymerization medium comprises a dispersing agent.

Claim 68 (Previously Presented): The process as claimed in claim 67, wherein the dispersing agent is present at up to 10% by weight for the weight of water.

Claim 69 (Previously Presented): The process as claimed in claim 68, wherein the dispersing agent is present at 0.01 to 5% by weight for the weight of water.

Claim 70 (Previously Presented): The process as claimed in claim 63, wherein the polymerization medium comprises an emulsifying agent.

Claim 71 (Previously Presented): The process as claimed in claim 70, wherein the emulsifying agent is present at up to 10% by weight, for the weight of water.

Claim 72 (Previously Presented): The process as claimed in claim 71, wherein the emulsifying agent is present at 0.01 to 5% by weight for the weight of water.

Claim 73 (Previously Presented): The process as claimed in claim 70, wherein the emulsifying agent is present in an amount greater than the critical micelle concentration.

Claim 74 (Previously Presented): The process as claimed in claim 73, wherein the amount of emulsifying agent is enough so that the polymerization takes place mainly in the micelles.

Claim 75 (Previously Presented): The process as claimed in claim 70, wherein the polymerization medium comprises a liquid organic phase and a cosurfactant.

Claim 76 (Cancelled)

Claim 77 (Previously Presented): The process as claimed in claim 75 wherein the cosurfactant has a solubility in water of less than 1×10^{-3} mol per liter at 20°C.

Claim 78 (Previously Presented): The process as claimed in claim 75 wherein the cosurfactant is present at up to 10% by weight for the weight of water.

Claim 79 (Previously Presented): The process as claimed in claim 75 wherein the emulsifying agent to cosurfactant mass ratio goes from 0.5 to 2.

Claim 80 (Previously Presented): The process as claimed in claim 58, wherein the concentration of the constituent (A) in the inert solvent is between 0.1 micromol and 100 millimol per liter of solution.

Claim 81 (Previously Presented): The process as claimed in claim 58, wherein the concentration of the constituent (B) in the inert solvent is between 0.1 micromol and 200 millimol per liter of solution.

Claim 82 (Previously Presented): The process as claimed in claim 58, wherein it is carried out in an inert atmosphere.

Claim 83 (Previously Presented): The process as claimed in claim 58, wherein, in a preliminary step, the constituents (A) and (B) in solution are brought into contact with each other in their inert solvent, for a duration of 30 seconds to 10 minutes, before their introduction into the reaction mixture, this precontacting step being carried out in an inert atmosphere, at a temperature of between 0 and 100°C.

Claim 84 (Previously Presented): The process as claimed in claim 83, wherein this precontacting step is carried out at a temperature between 10 and 70°C.

Claim 85 (Previously Presented): The process as claimed in claim 58, wherein the constituents (A) and (B), which are in solution in their inert solvent, are introduced separately into the reaction mixture, the latter being held at a temperature of from 0 to 100° C.

Claim 86 (Previously Presented): The process as claimed in claim 85, wherein the reaction mixture is held at a temperature from 10 to 70°C.

Claim 87 (Previously Presented): The process as claimed in claim 58, wherein the (co)polymerization is carried out at a temperature of between 25 and 200°C.

Claim 88 (Previously Presented): The process as claimed in claim 58, wherein the (co)polymerization is carried out at a total absolute pressure of from 1 to 100 bar.

Claim 89 (Previously Presented): The process as claimed in claim 58, wherein the olefin or olefins intended to be polymerized are introduced in gas or liquid form, with enough stirring of the polymerization medium.

Claim 90 (Previously Presented): The process according to claim 58, characterized in that the olefins are chosen from ethylene, α- olefins, cyclic olefins and compounds of formula:

$$CH_2=CH-(CH_2)_n - G -$$

in which:

- n is an integer between 2 and 20; and
- G is a radical chosen from:

  -OH; $CHOHCH_2OH$; OT; $-CF_3$; -COOT; -COOH;

  $-Si(OH)_3$; $-Si(OT)_3$;

  T is a hydrocarbon radical having from 1 to 20 carbon atoms.

Claim 91 (Previously Presented): The process as claimed in claim 58, wherein at least one olefin is ethylene.

Claim 92 (Previously Presented): The process as claimed in claim 70, wherein the polymerization is carried out in the presence of an emulsifying agent, leading therefore to a latex, if necessary after a filtration step.

Claim 93 (Previously Presented): The process as claimed in claim 92, wherein the latex is a high-density polyethylene or a medium-density polyethylene or a low-density polyethylene.

Claim 94 (Previously Presented): The process as claimed in claim 71, wherein the emulsifying agent is present at up to 0.01 to 5% by weight, for the weight of water.

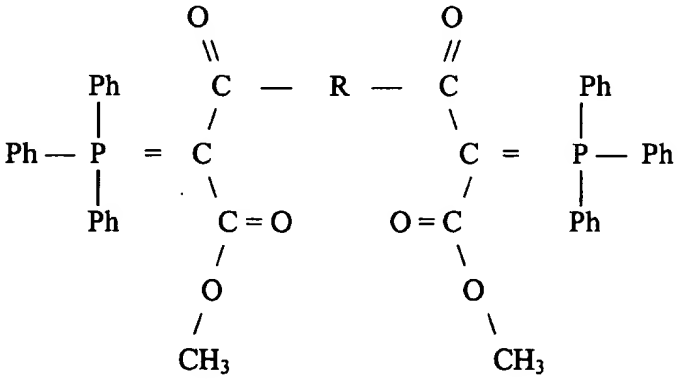
Claim 95 (Cancelled)

Claim 96 (Cancelled)

Claim 97 (New): A catalytic system for the polymerization of at least one olefin in a diluting medium in the presence of the catalytic system, the catalytic system being formed *in situ* from:

(A) at least one ligand selected from the group consisting of:

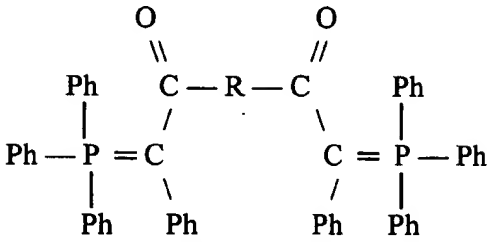
a ligand represented by formula (Ia):



(Ia)

where R represents a 5,6-bicyclo[2.2.1]hept-2-ene radical; $-(CH_2)_4-$; or $-(CH_2)_8-$;

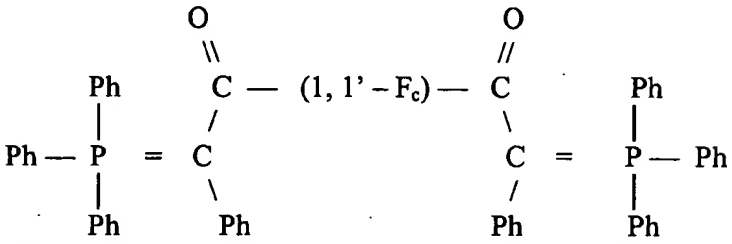
a ligand represented by formula (Ib):



(Ib)

wherein R represents a 5,6-bicyclo[2.2.2]-hept-2-ene radical or $-(CH_2)_8-$;

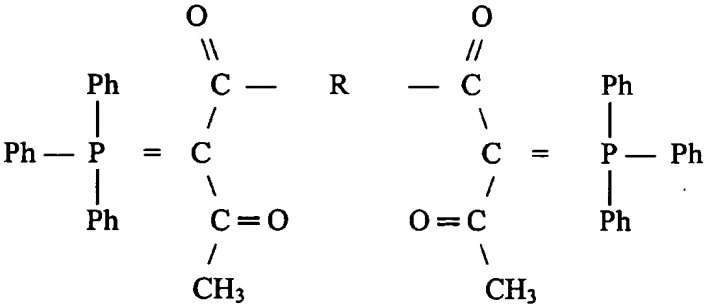
a ligand represented by formula (Ic):



(Ic)

where 1,1'-F_c represents a-1,1'-ferrocenylene radical;

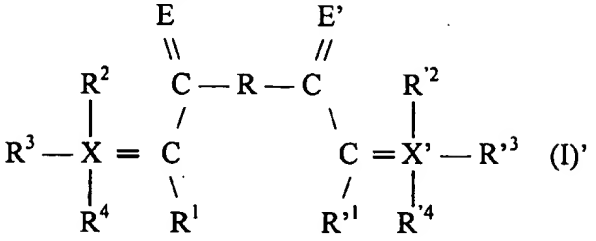
a ligand represented by formula (Id'):



(Id')

where R represents a pheny radical of the formula 1,4-C_6H_4; and

a ligand represented by formula (I)':



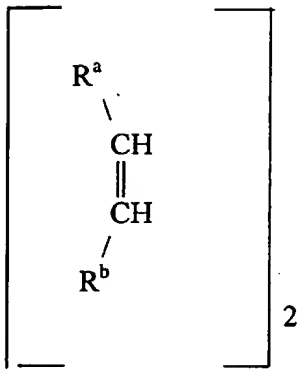
(I)'

where:

- E and E' each represent independently an oxygen or a sulfur atom;
- X and X' each represent independently a phosphorus, arsenic or antimony atom;
- the radicals R^1 and R'^1, which are identical or different, are selected from the group consisting of:
  * branched or cyclic alkyl radicals;
  * arylalkyl radicals;
  * alkylaryl radicals;
  * halogens;
  * hydroxyl radical; and
  * alkoxide radicals;
- the R^2, R'^2, R^3, R'^3, R^4 and R'^4 radicals, which are identical or different, are selected from the group consisting of linear, branched or cyclic alkyl radicals; and
- R is a divalent radical; and

(B) at least one nickel compound selected from:

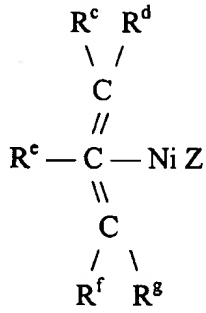
(B1) nickel complexes with a zero oxidation state, which are represented by the general formula (II):



(II)

where R^a and R^b each represent independently a hydrogen atom, or a linear, branched or cyclic alkyl radical or aryl, arylalkyl or alkylaryl radical, which have up to 8 carbon atoms, it being also possible for R^a and R^b to form together a divalent aliphatic group of 2 to 10 carbon atoms and have up to three olefinic double bonds as the only carbon-carbon unsaturated groups;

(B2) π-allylnickels, which are represented by the formula (III):



(III)

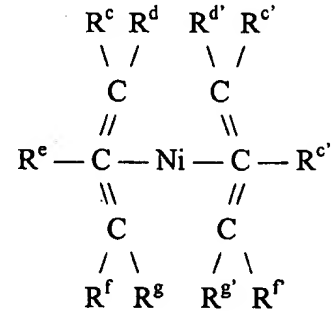
in which:

- the R^c, R^d, R^e, R^f and R^g radicals, which are identical or different, are selected from hydrogen, linear, branched or cyclic alkyl radicals and aryl, arylalkyl or alkylaryl radicals, having up to 8 carbon atoms;
- the dotted lines represent the electron delocalization on the three contiguous carbon atoms;

- an R^c or R^d radical may also form, with an R^e or R^f or R^g radical, a divalent alkene group having from 2 to 10 carbon atoms and able to have up to three olefinic double bonds; and

- Z represents a halogen, an alkoxy group or an alkanoyloxy group;

(B3) compounds of the bis(allyl)nickel type which are represented by the (IV):

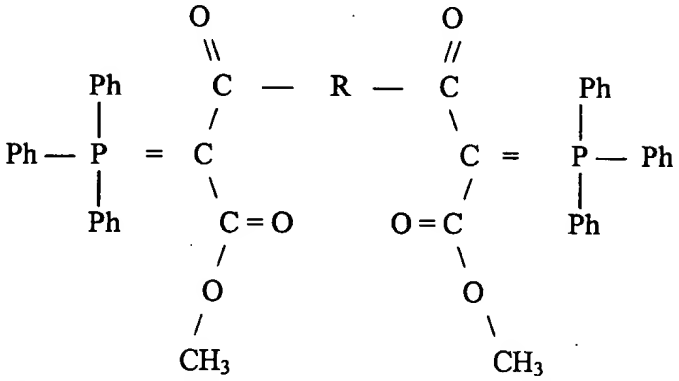


(IV)

in which:

- the radicals R^c to R^g, and $R^{c'}$ to $R^{g'}$, which are identical or different, are selected from hydrogen, linear, branched or cyclic alkyl radicals and aryl, arylalkyl or alkylaryl radicals having up to 8 carbon atoms;
- the dotted lines represent the electron delocalization on the three contiguous carbon atoms;
- a radical R^c or R^d also able to form, with a radical R^e or R^f or R^g, a divalent alkene group having from 2 to 10 carbon atoms and able to have up to three olefinic double bonds;
- a radical $R^{c'}$ or $R^{d'}$ also able to form, with a radical $R^{e'}$ or $R^{f'}$ or $R^{g'}$, a divalent alkene group having from 2 to 10 carbon atoms and able to have up to three olefinic double bonds.

Claim 98 (New): The catalytic system of claim 97, wherein the at least one ligand (A) is a ligand represented by formula (Ia'):



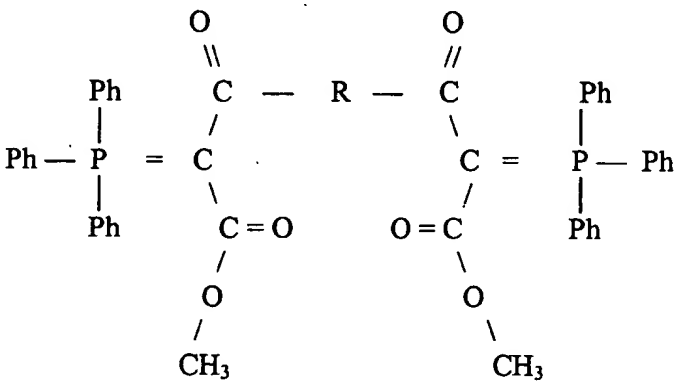
(Ia')

where R represents a 5,6-bicyclo[2.2.1]hept-2-ene radical.

Claim 99 (New): A process for the polymerization of at least one olefin in a diluting medium in the presence of a catalytic system, the catalytic system being formed *in situ* from:

(A) at least one ligand selected from the group consisting of:

a ligand represented by formula (Ia):



(Ia)

where R represents a 5,6-bicyclo[2.2.1]hept-2-ene radical; $-(CH_2)_4-$ or $-(CH_2)_8-$;

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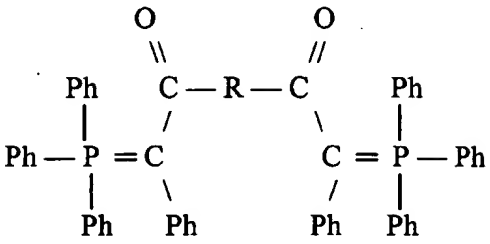
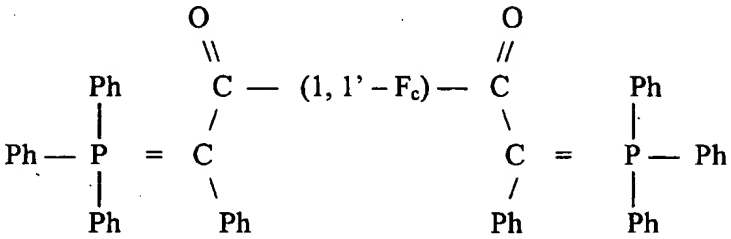
a ligand represented by formula (Ib):



(Ib)

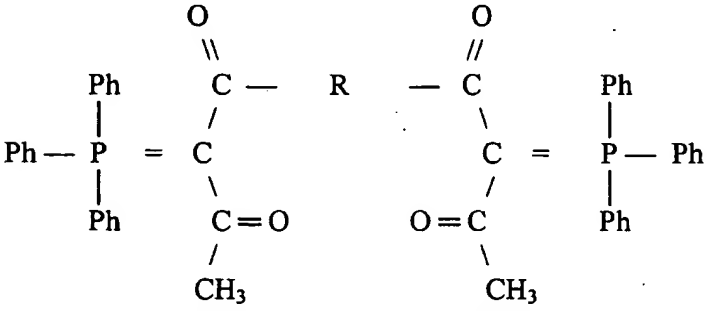
a ligand represented by formula (Ic):



(Ic)

where 1,1'-F_c represents a-1,1'-ferrocenylene radical; and

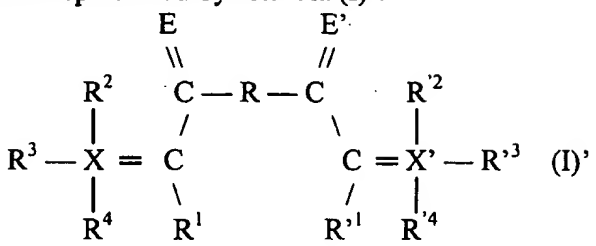
a ligand represented by formula (Id'):



(Id')

where R represents a pheny radical of the formula 1,4-C_6H_4; and

a ligand represented by formula (I)':



(I)'

where:

- E and E' each represent independently an oxygen or a sulfur atom;

- X and X' each represent independently a phosphorus, arsenic or antimony atom;

- the radicals R^1 and R'^1, which are identical or different, are selected from the group consisting of:

  * branched or cyclic alkyl radicals;

  * arylalkyl radicals;

  * alkylaryl radicals;

  * halogens;

  * hydroxyl radical; and

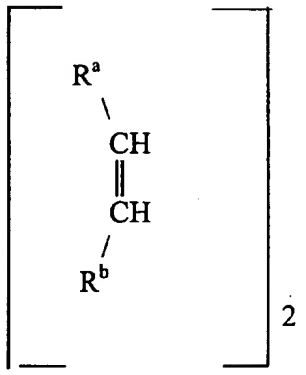
  * alkoxide radicals;

- the R^2, R'^2, R^3, R'^3, R^4 and R'^4 radicals, which are identical or different, are selected from the group consisting of linear, branched or cyclic alkyl radicals; and

- R is a divalent radical; and

(B) at least one nickel compound selected from:

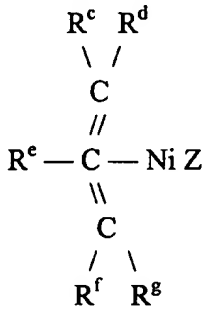
(B1) nickel complexes with a zero oxidation state, which are represented by the general formula (II):



(II)

where R^a and R^b each represent independently a hydrogen atom, or a linear, branched or cyclic alkyl radical or aryl, arylalkyl or alkylaryl radical, which have up to 8 carbon atoms, it being also possible for R^a and R^b to form together a divalent aliphatic group of 2 to 10 carbon atoms and have up to three olefinic double bonds as the only carbon-carbon unsaturated groups;

(B2) π-allylnickels, which are represented by the formula (III):



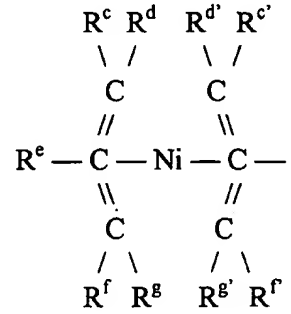
(III)

in which:

- the R^c, R^d, R^e, R^f and R^g radicals, which are identical or different, are selected from hydrogen, linear, branched or cyclic alkyl radicals and aryl, arylalkyl or alkylaryl radicals, having up to 8 carbon atoms;
- the dotted lines represent the electron delocalization on the three contiguous carbon atoms;

- an R^c or R^d radical may also form, with an R^e or R^f or R^g radical, a divalent alkene group having from 2 to 10 carbon atoms and able to have up to three olefinic double bonds; and
- Z represents a halogen, an alkoxy group or an alkanoyloxy group;

(B3) compounds of the bis(allyl)nickel type which are represented by the (IV):



(IV)

in which:

- the radicals R^c to R^g, and $R^{c'}$ to $R^{g'}$, which are identical or different, are selected from hydrogen, linear, branched or cyclic alkyl radicals and aryl, arylalkyl or alkylaryl radicals having up to 8 carbon atoms;
- the dotted lines represent the electron delocalization on the three contiguous carbon atoms;
- a radical R^c or R^d also able to form, with a radical R^e or R^f or R^g, a divalent alkene group having from 2 to 10 carbon atoms and able to have up to three olefinic double bonds;
- a radical $R^{c'}$ or $R^{d'}$ also able to form, with a radical $R^{e'}$ or $R^{f'}$ or $R^{g'}$, a divalent alkene group having from 2 to 10 carbon atoms and able to have up to three olefinic double bonds.

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